

Tableau Data Visualization

The Use of Tableau for Improved Data Visualization at SLAC's User Facilities



Tableau: Tools to Build Partnerships and Improve Analysis



Power in Numbers The **User Portal development team** at SLAC National Accelerator Laboratory is highly motivated towards deeper integration with our internal teams and partners (Central DevOps/Stanford IT), and potentially other user facilities within the DOE complex

- **Data analytics** is one domain that is allowing us to strengthen our internal partnerships, across our own user facilities and potentially others
- **Collaboration and reporting** around user statistics and user engagement patterns present opportunities to build more profound relationships within SLAC and the DOE complex:
 - Self-provisioned reporting at SLAC and the DOE
 - Standardized benchmarking interfaces for SLAC, the DOE, and other user facilities

Why Tableau for Data Visualization?

Improved analysis, decision-making, and reporting

- Rapid data exploration capabilities accelerate insights
- Collaboration around data (commenting, sharing, exporting)
- Automation around system tasks (data refreshes)
- Application performance and usage tracking
- Security
 - Dual-factor authentication
 - Identity management against Stanford's Active Directory (SUNetID required)
 - Tableau licensed accounts/roles, group and individual permissions, and access controls around data connections, workbooks and views
 - Control over publishing workflows
- Our partnership with Stanford University
 - Educational licensing drives Total Cost of Ownership down
 - Stanford IT manages certain aspects of the infrastructure (servers, security, ...)
 - Community of Practice (CoP)/User Groups around Tableau



Products Stories Learning Community Support About

BUY SIGN IN

TRY NOW



Tableau Server Analytics for organizations

SEE IT IN ACTION

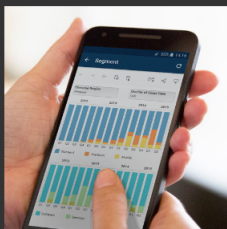


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URA Development: Views - X

https://tableau.stanford.edu/#/site/SSRL/projects/236/views

Search

Content Users Groups Schedules Tasks Status

Home > URA Development

URA Development

Rename...

PROJECT

Workbooks 2 Views 9 Data Sources 7 Permissions Details

0 selected Sort by: Name (A-Z)

General Filters

Owner

Tag

Modified on or after

Modified on or before

☐ Only my favorites

☐ Only my recently viewed

Dashboard 1

EORS Main

EORS Main

EORS Percentages

EORS Table

EORS Table

EORS Table Stats

EORS Text Input

EORS Time

URA Development: Permis...

https://tableau.stanford.edu/#/site/SSRL/projects/236/permissions

Stojanovic, Nikola

Content

Users

Groups

Schedules

Tasks

Status

Home > URA Development

URA Development

Rename...

PROJECT

Workbooks 2

Views 9

Data Sources 7

Permissions

Details

Search for a user to view their permissions

Permissions for workbooks and data sources are: Managed by the owner...

User / Group	Project	Workbooks	View	Interact	Edit	Data Sources
All Users (25)	None	None				None
URA Developers (3)	Viewer	Custom				Connector

+ Add a user or group rule

Search for a user or select a permission rule above to view user permissions.

Users - Tableau Server

https://tableau.stanford.edu/#/site/SSRL/users

Search

Stojanovic, Nikola

Content

Users

Groups

Schedules

Tasks

Status

Users 23

+

Add Users

▼ 0 selected

General Filters

Site role

Any site role

	Display name		Username	Site role	Groups	Domain	Last signed in
<input type="checkbox"/>	Alan P. Winston	***	apw	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Alan R. Fry	***	alanrfy	Interactor	2	win.stanford.edu	Apr 20, 2016, 5:37 PM
<input type="checkbox"/>	Amedeo Perazzo	***	perazzo	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Anthony Michael Dunne	***	mdunne1	Interactor	2	win.stanford.edu	Apr 20, 2016, 12:03 PM
<input type="checkbox"/>	Axel Brachmann	***	axelb	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Aymeric Robert	***	aymericr	Interactor	2	win.stanford.edu	Apr 25, 2016, 3:31 PM
<input type="checkbox"/>	Bill White	***	wewhite	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Britt Hedman	***	bhedman	Unlicensed	2	win.stanford.edu	
<input type="checkbox"/>	Cathy J. Knotts	***	knotts	Unlicensed	2	win.stanford.edu	
<input type="checkbox"/>	Clemens J. Wermelskirchen	***	wermelsk	Publisher	2	win.stanford.edu	May 31, 2016, 3:54 PM
<input type="checkbox"/>	David Mark Fritz	***	dmfritz	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Elizabeth Z Goodwin	***	egoodwin	Interactor	2	win.stanford.edu	Jun 13, 2016, 1:08 PM
<input type="checkbox"/>	Gaifong	***	gaifong	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Guest	***	guest	Guest	1	local	
<input type="checkbox"/>	Ian Walter Evans	***	iwevans	Interactor	2	win.stanford.edu	Apr 20, 2016, 11:49 PM
<input type="checkbox"/>	John F. Schmerge	***	schmerge	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Kelly J. Gaffney	***	kgaffney	Unlicensed	2	win.stanford.edu	
<input type="checkbox"/>	Lisa B. Dunn	***	lbdunn	Unlicensed	2	win.stanford.edu	
<input type="checkbox"/>	Nicholas Kelez	***	nkelez	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Piero A. Pianetta	***	pianetta	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Robert W Schoenlein	***	rwschoen	Interactor	2	win.stanford.edu	
<input type="checkbox"/>	Sacha Hanigan	***	sachah	Interactor	3	win.stanford.edu	
<input type="checkbox"/>	Stojanovic, Nikola	***	stojanik	Site Administrator	4	win.stanford.edu	Jun 14, 2016, 11:00 AM

URA Development: Data Sources

https://tableau.stanford.edu/#/site/SSRL/projects/236/datasources

tableau

Search

Stojanovic, Nikola

ContentUsersGroupsSchedulesTasksStatus

Home > URA Development

URA Development

PROJECT

Workbooks 2Views 9Data Sources 7PermissionsDetails

0 selected

General Filters

Owner

Tag

Modified on or after

Modified on or before

Has an alert

Data Source Filters

Data Source

Published

Connection type

Server name

Server port

Any port

Database username

Password status

Any status

Has a data extract

	Name	Connection type	Connects to	Live / Last extract	Owner	Modified	
<input type="checkbox"/>	EORS DOE Questions	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	May 31, 2016, 4:56 PM	
<input type="checkbox"/>	EORS Questions	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	May 31, 2016, 4:53 PM	
<input type="checkbox"/>	EORS Questions + People	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	May 31, 2016, 5:02 PM	
<input type="checkbox"/>	LCLS Shifts Reports	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	May 31, 2016, 4:40 PM	
<input type="checkbox"/>	URA Audit Log	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	Mar 7, 2016, 3:24 PM	
<input type="checkbox"/>	URA Events	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	May 27, 2016, 3:00 PM	
<input type="checkbox"/>	URA Proposals	HP Vertica	ssri-vdb1.slac.stanford.edu	Live	Stojanovic, Nikola	May 27, 2016, 2:53 PM	

Schedules 22

0 selected

	↑ Name	Frequency	Task type	Tasks	Execution	Next run at
<input type="checkbox"/>	15th of Month	Monthly	Subscription		Parallel	Jun 15, 2016, 12:00 AM
<input type="checkbox"/>	Begin of month	Monthly	Subscription		Parallel	Jun 30, 2016, 12:00 AM
<input type="checkbox"/>	Daily 2 hour (6am to 4pm)	Hourly	Extract Refresh	0	Parallel	Jun 14, 2016, 2:00 PM
<input type="checkbox"/>	Daily Morning (2AM)	Daily	Extract Refresh	0	Parallel	Jun 15, 2016, 2:00 AM
<input type="checkbox"/>	Daily Morning (5AM)	Daily	Extract Refresh	0	Parallel	Jun 15, 2016, 5:00 AM
<input type="checkbox"/>	Daily weekday afternoon (1pm)	Weekly	Subscription		Parallel	Jun 14, 2016, 1:00 PM
<input type="checkbox"/>	Daily weekday afternoon extract (1pm)	Weekly	Extract Refresh	0	Parallel	Jun 14, 2016, 1:00 PM
<input type="checkbox"/>	Daily weekday late evening	Weekly	Subscription		Parallel	Jun 14, 2016, 7:00 PM
<input type="checkbox"/>	Daily weekday mornings (6am)	Weekly	Subscription		Parallel	Jun 15, 2016, 6:00 AM
<input type="checkbox"/>	End of the month	Monthly	Extract Refresh	0	Parallel	Jun 30, 2016, 11:00 PM
<input type="checkbox"/>	Every 30 minutes	Hourly	Subscription		Parallel	Jun 14, 2016, 12:30 PM
<input type="checkbox"/>	Every 6th Day Of The Month	Monthly	Extract Refresh	0	Parallel	Jul 6, 2016, 6:00 PM
<input type="checkbox"/>	Monday morning	Weekly	Subscription		Parallel	Jun 20, 2016, 6:00 AM
<input type="checkbox"/>	Monday Morning (6am)	Weekly	Subscription		Parallel	Jun 20, 2016, 6:00 AM
<input type="checkbox"/>	Run Three Times Everyday	Hourly	Extract Refresh	0	Parallel	Jun 14, 2016, 3:00 PM
<input type="checkbox"/>	Saturday mornings	Weekly	Subscription		Parallel	Jun 18, 2016, 6:00 AM
<input type="checkbox"/>	Saturday night	Weekly	Extract Refresh	0	Parallel	Jun 18, 2016, 11:00 PM
<input type="checkbox"/>	Wednesday Morning (6am)	Weekly	Subscription		Parallel	Jun 15, 2016, 6:00 AM
<input type="checkbox"/>	Weekday early mornings	Weekly	Extract Refresh	0	Parallel	Jun 15, 2016, 4:00 AM
<input type="checkbox"/>	Weekday Extract Refresh	Weekly	Extract Refresh	0	Parallel	Jun 15, 2016, 6:00 AM
<input type="checkbox"/>	Weekday mornings	Weekly	Subscription		Parallel	Jun 15, 2016, 6:00 AM
<input type="checkbox"/>	Weekly Monday afternoon (1pm)	Weekly	Extract Refresh	0	Parallel	Jun 20, 2016, 1:00 PM

Site Status

Analysis

Dashboards that monitor site activity.

Views	Analysis
Traffic to Views	View count, viewers, and viewer behavior for published views.
Traffic to Data Sources	Data source usage, users, and user behavior for published data sources.
Actions by All Users	Actions for all users.
Actions by Specific User	Actions for a specific user, including items used.
Actions by Recent Users	Recent actions by users, including last action time and idle time.
Background Tasks for Extracts	Completed and pending extract task details.
Background Tasks for Non Extracts	Completed and pending background task details (non-extract).
Stats for Load Times	View load times and performance history.
Stats for Space Usage	Space used by published workbooks and data sources, including extracts and live connections.

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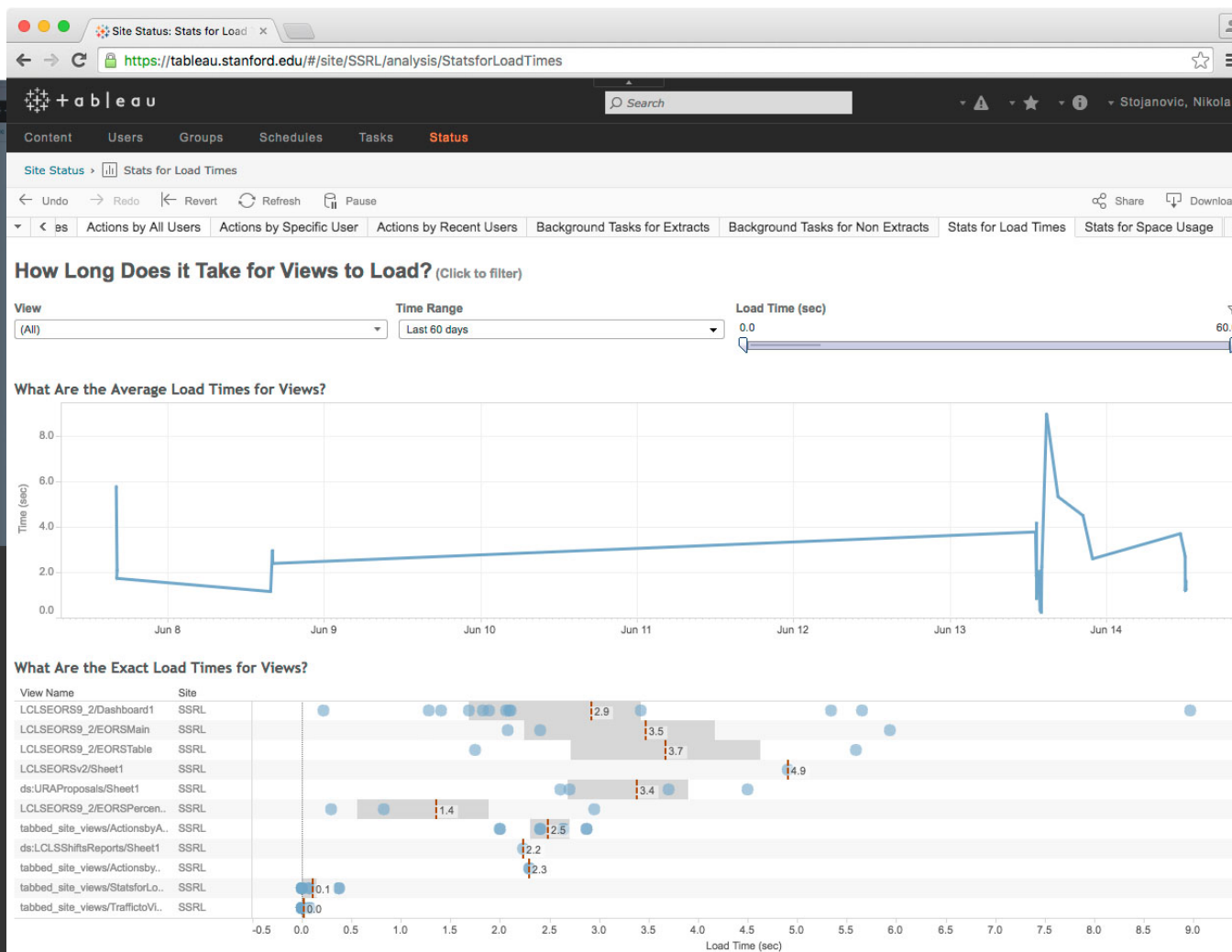
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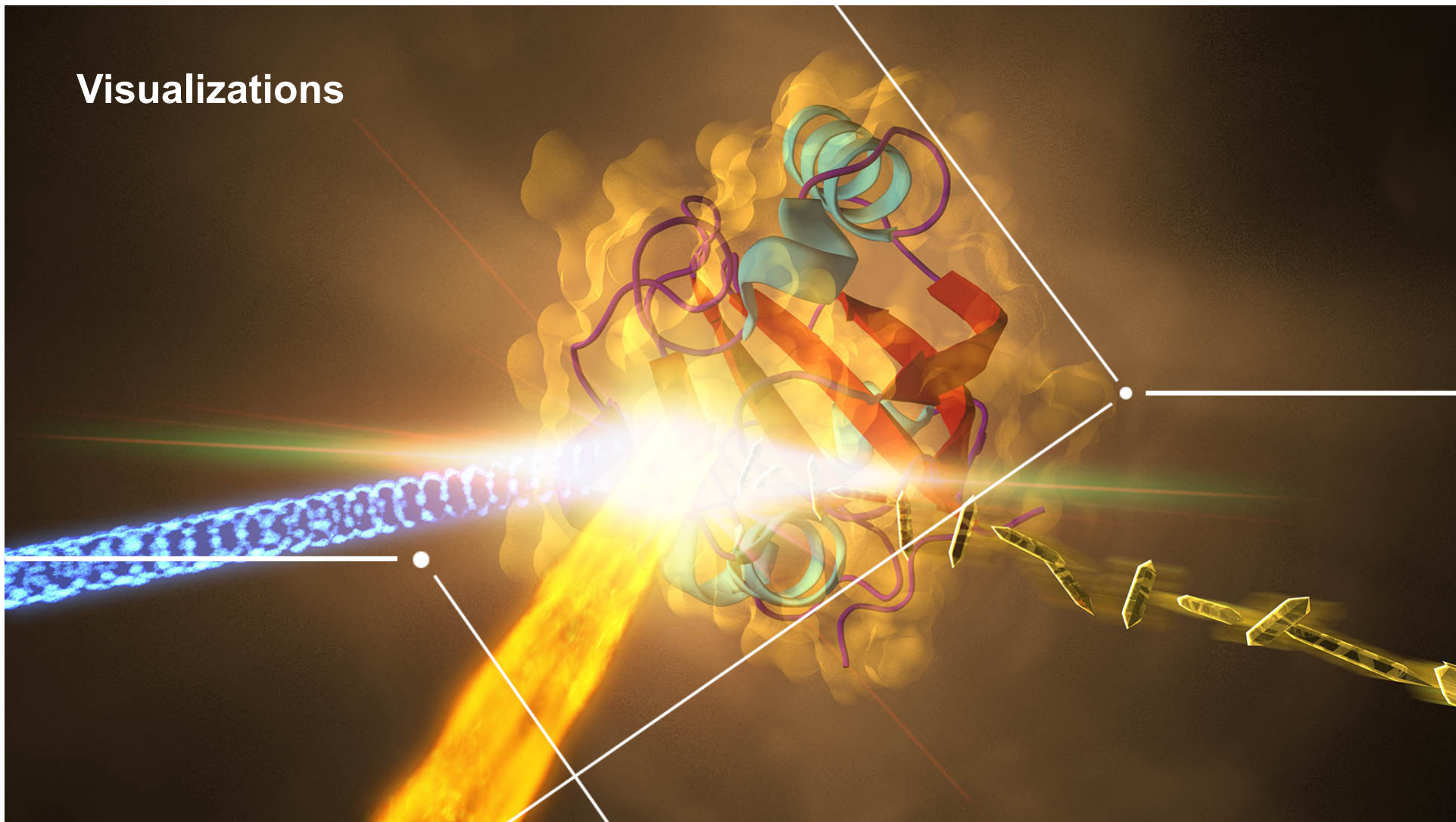


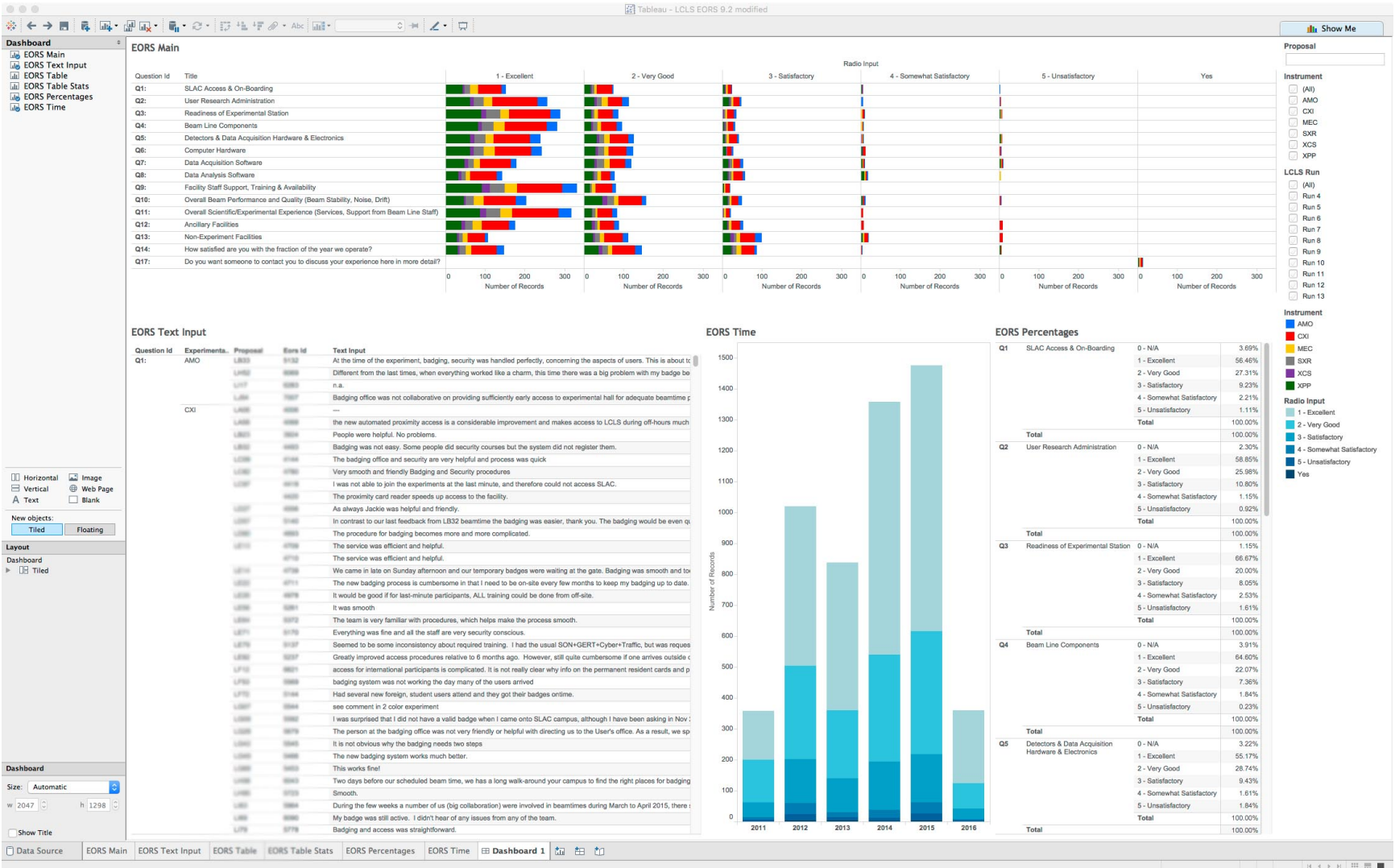
What Are We Analyzing (and hope to) with Tableau?

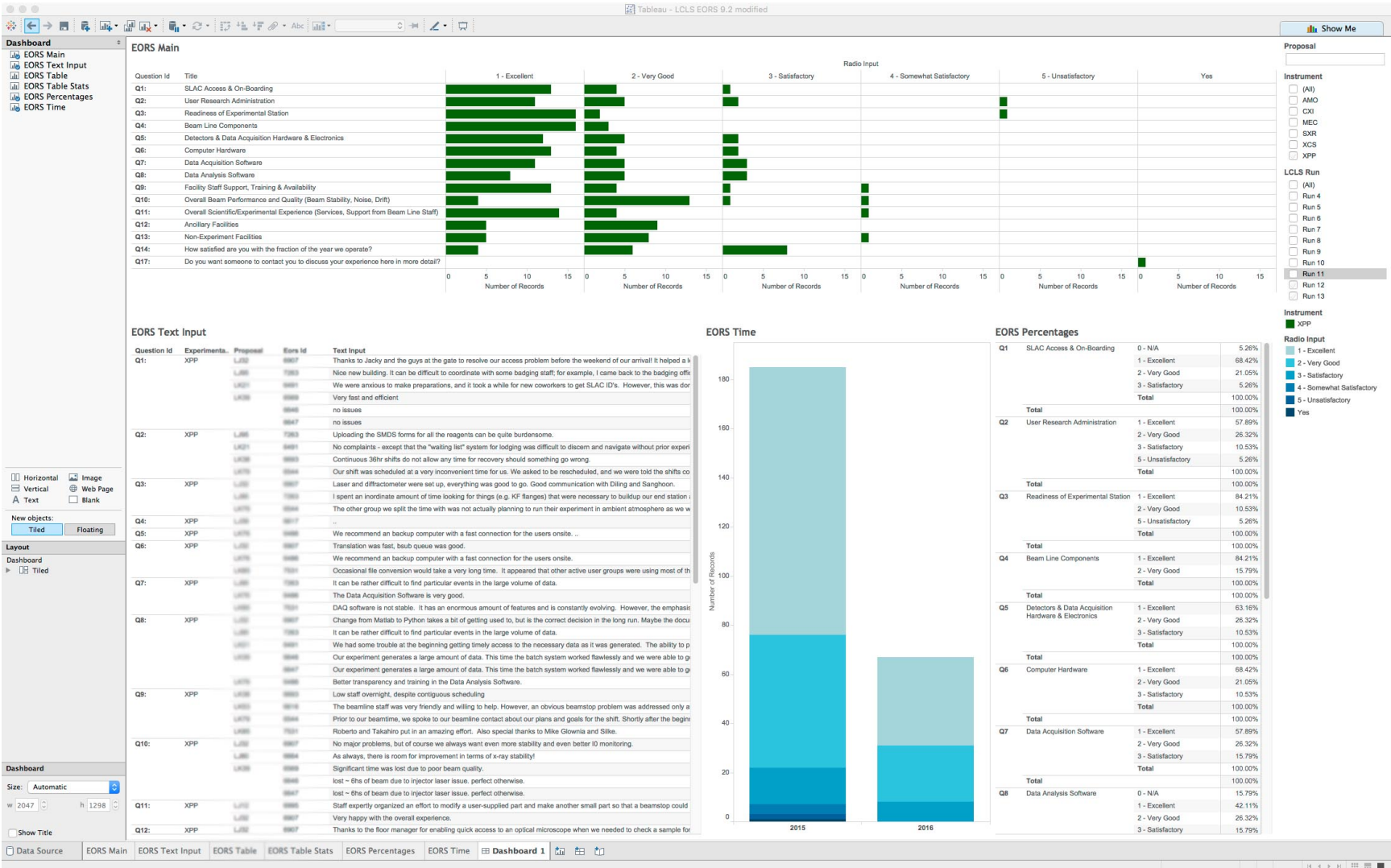


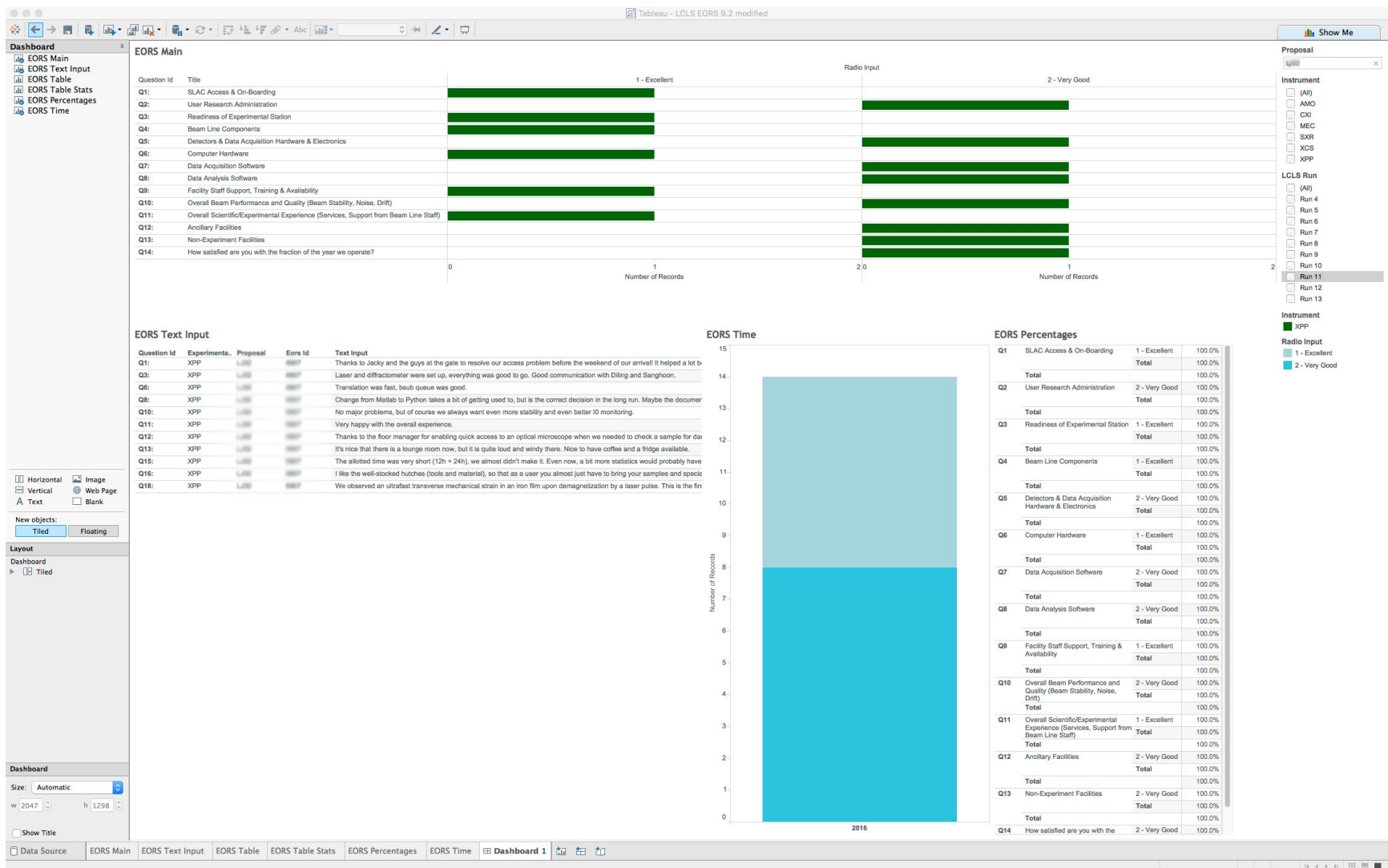
- End of Run Survey (EORS) user satisfaction analysis
 - Rating distributions (instrument, run), sentiment analysis, performance over time
 - Integration with LCLS staff scientist reviews
- User demographics
- Proposal and researcher profiles
 - Preferred research areas, funding sources, techniques, collaborator network analysis, institutional performance (e.g. proposal success rates)
- Beam line/instrument profiles
 - Utilization, publications, ...
- Other integration points (Google Analytics, Splunk, custom User Portal event tracking, exception handling and application performance)

Visualizations

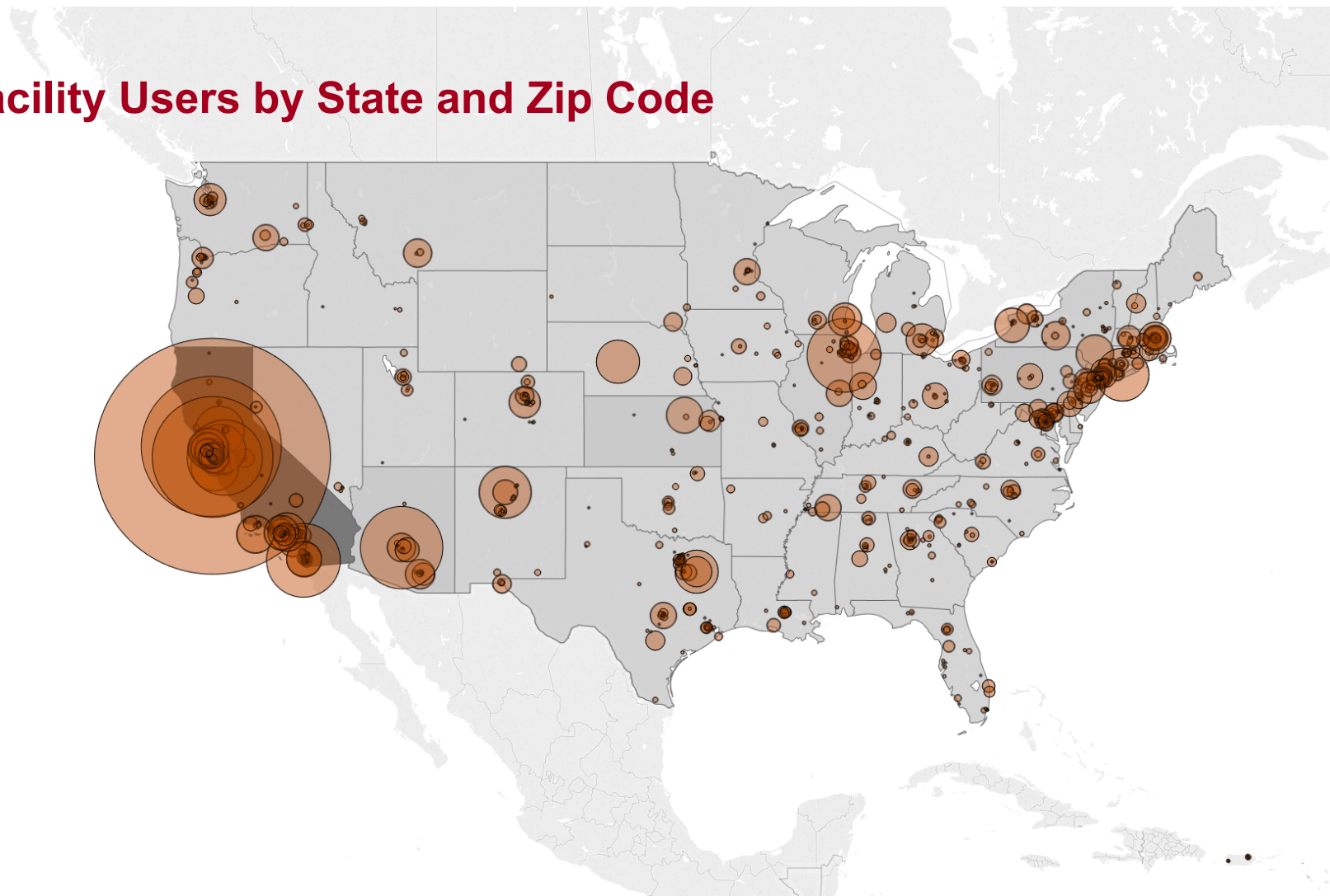




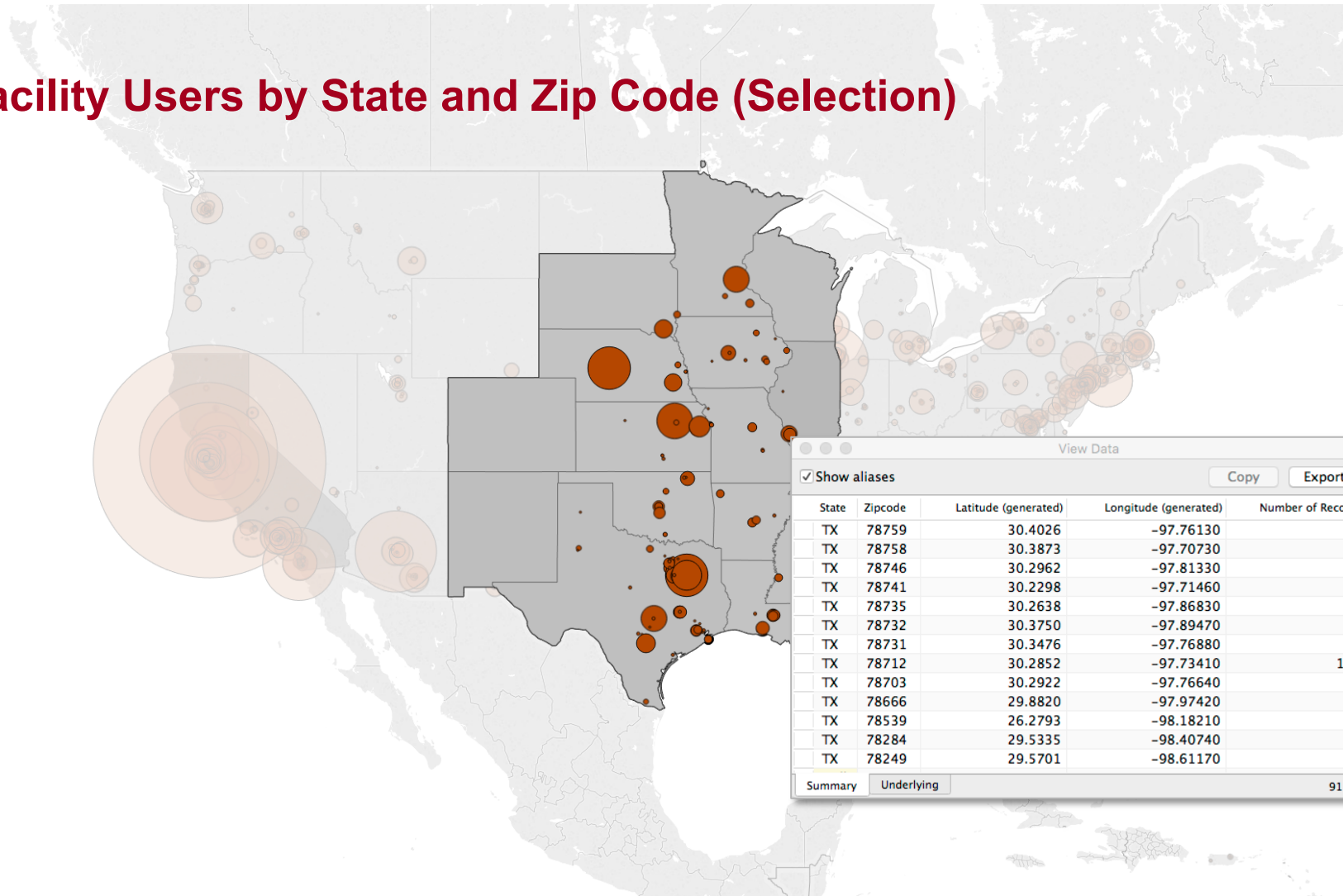




Facility Users by State and Zip Code

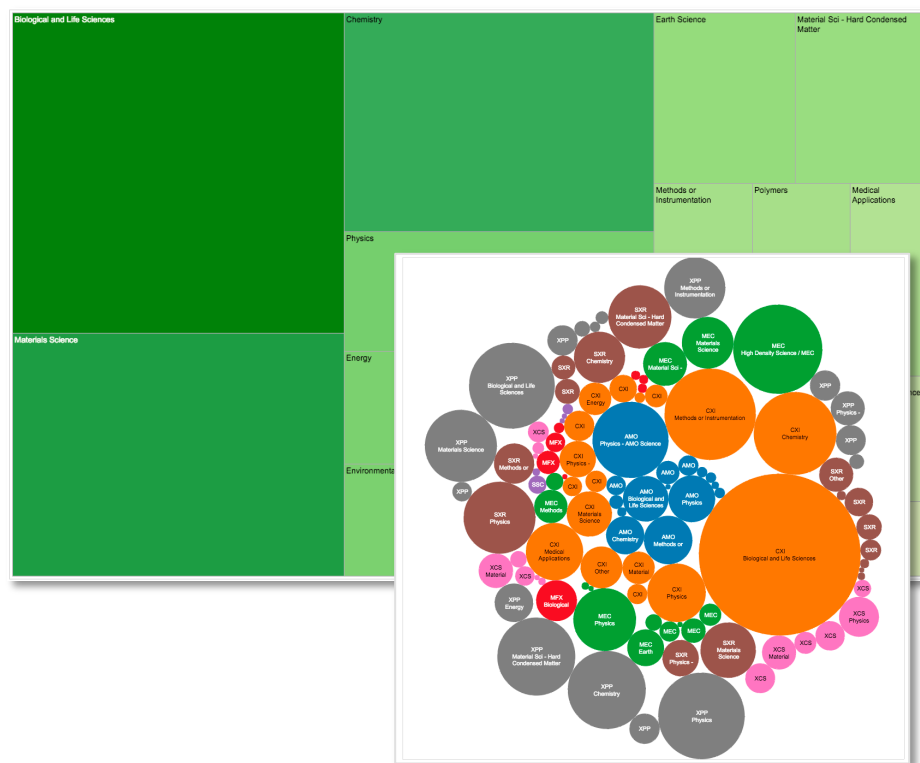


Facility Users by State and Zip Code (Selection)



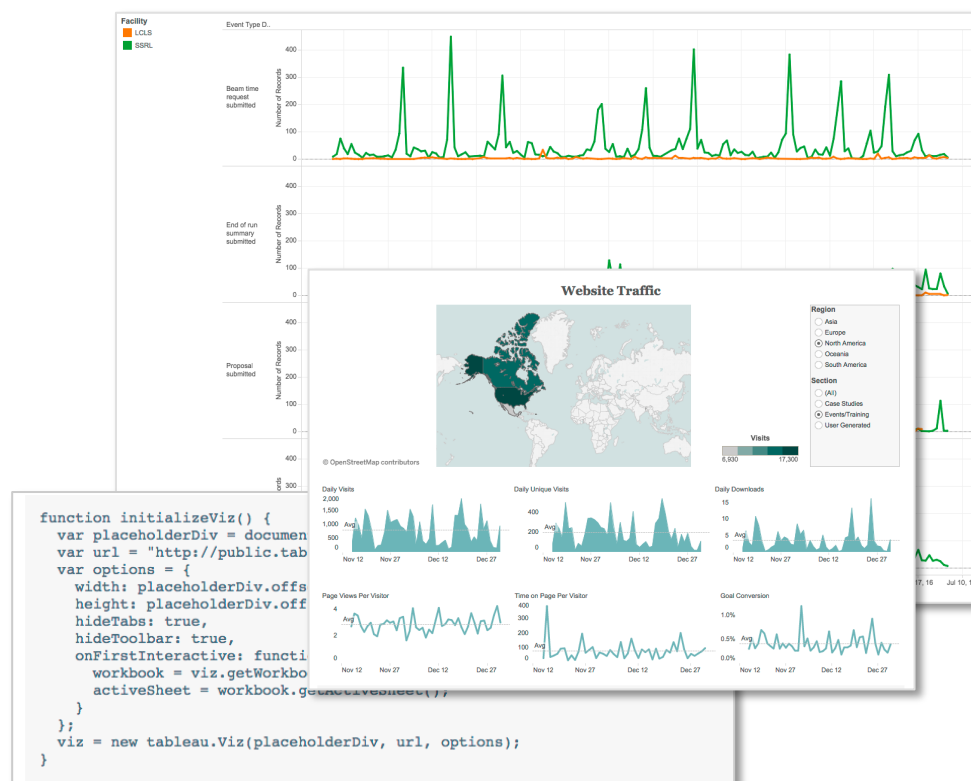
Key Benefits for Managers and Administrators

- **Dashboards & Visualizations:**
Time-to-Insight is accelerated with deeper understanding of our users' engagement patterns and research experiences
- **Self-provisioned reports** allow for accelerated diffusion of knowledge, quicker DOE reporting, and exploration around data
- **Collaboration:** Shared insights leverage different perspectives and promote partnership between teams



Key Benefits for Development Team

- **Dashboards:** Time-to-Insight is accelerated with deeper understanding of our data structures, data quality, and application performance
- **Integration** with other services like Google Analytics, Splunk, custom web services and data connectors promote analysis on one platform from multiple data sources
- **JavaScript and REST APIs** allow programmatic interaction with Tableau for customized interfaces and automation around server tasks



Key Benefits for Facility Users



- **Dashboards:** Promote insights into facility users' research activities and collaborations
 - Beam time allocation versus utilization
 - Publications
- **Embedded analytics** in our User Portal promote transparency and benchmarking against other research activities
- **Service and application enhancement**
 - Drives the feedback loop faster

SLAC NATIONAL ACCELERATOR LABORATORY

USER PORTAL

Home John Smith

Home SSRIL LCLS

Welcome John Smith

Edit FAQ Help Feedback

User Profile

SLAC ID (SID)	480
Proximity Card	13238 Expires on 06/30/2016
User Agreement	University of Kalamazoo Expired 05/25/2016
Facilities	LCLS, SSRIL

ACCESS INFORMATION

General Training

SON (396)	✓
GERT (115)	✓
Traffic Safety (154)	—
CyberSecurity Basics (CS101)	✓
Cyber Security Refresher (CS200)	✓

ALL TRAINING

Facility Training

Lightsource Access Agreement	✓
SSRIL Hutch Training	✓
Sample Prep Lab Access Training	✓
Laser Training	✓

ALL TRAINING

SLAC National Accelerator Laboratory



- Early stage Tableau adoption. We are still exploring applications.
- Please email stojanik@slac.stanford.edu with any questions or feedback.